Multidisciplinary Arctic Program (MAP) – Last Ice: Science Logistics Meeting Report, Spring 2018 Field Campaign

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2018

Canadian Manuscript Report of
Fisheries and Aquatic Sciences 3156

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Cat. Fs 97-4/3156E-PDF ISBN 978-0-660-26932-0 ISSN 1488-5387

Correct citation for this publication:

Lange, B., Michel, C. 2018. Multidisciplinary Arctic Program (MAP) – Last Ice: Science Logistics Meeting Report, Spring 2018 Field Campaign. Can. Manuscr. Rep. Fish. Aquat. Sci. 3156: vii + 12 p.

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ABSTRACT

Lange, B., Michel, C. 2018. Multidisciplinary Arctic Program (MAP) – Last Ice: Science Logistics Planning Meeting Report, January 2018. Can. Manuscr. Rep. Fish. Aquat. Sci. 3156: vii + 12 p.

The Last Ice Area (LIA) is the only Arctic region that is expected to retain summer sea ice until 2050. Due to the importance of this region, Fisheries and Oceans Canada has initiated the Multidisciplinary Arctic Program (MAP) – Last Ice Science Program, to characterize the ecosystem of the LIA. This region is one of the most inaccessible regions in the world and therefore is lacking baseline ecological knowledge. One of the main difficulties of working in the LIA relates to logistical constraints of accessibility and sampling in a multiyear ice environment. Thus, logistical planning is of utmost importance for the success of such a campaign. This report summarizes discussions concerning the logistical planning for the 2018 Spring MAP-Last Ice field campaign and, to a lesser extent subsequent field campaigns.

RÉSUMÉ

Michel, C., Lange, B. 2018. Programme multidisciplinaire arctique (PMA) – Glace séculaire: Rapport de la réunion de planification logistique, janvier 2018. Can. Manus. Rep. Fish. Aquat. Sci. 3156: vii + 12 p.

La zone séculaire de glace (ZSG) est la seule région arctique où il est prévu que la glace subsiste en été d'ici 2050. Étant donné l'importance de cette région, Pêches et Océans Canada a initié le Programme multidisciplinaire arctique (PMA) – Glace séculaire, afin de caractériser l'écosystème de la ZSG. Cette région est l'une des plus inaccessible de la planète et, conséquemment, les connaissances écosystémiques de base y sont manquantes. Une des difficultés majeures du travail dans la ZSG est liée aux contraintes d'accessibilité et d'échantillonnage dans un environnement de glace multi-annuelle. De ce fait, la planification logistique est primordiale pour le succès de l'échantillonnage. Ce rapport synthétise les discussions concernant la planification logistique pour la campagne d'échantillonnage du printemps 2018 PMA– Glace séculaire, et moindrement, pour les campagnes subséquentes.

ACKNOWLEDGEMENTS

The Last Ice Area (LIA) Science Program was initiated by Fisheries and Oceans Canada (DFO) in the fall of 2018, rapidly followed by the Logistics Meeting which set in motion the logistics to put in place the first LIA field campaign in the spring of 2018. The LIA Science Logistics Planning Meeting was organized with the help and commitment of Joclyn Paulic, Tracey Loewen, Kim Thomas, Diane Jones, and Don Cobb to whom we extend our warmest thanks. Special thanks go to Dr. Robert Young, Division Manager, Arctic Aquatic Research Division (DFO, Central and Arctic Region) for his support to the LIA program and the Workshop. We can not overstate the importance of a government-wide approach to the logistics of the LIA Program, and extend special thanks to Tom Platt and Tim McCagherty (Natural Resource Canada, Polar Continental Shelf Program (PCSP)), Andrew Platt (Environment and Climate Change Canada, ECCC), and Jim Milne and Chris Brown (Defence Research and Development Canada, DRDC). We also thank international partners from the Alfred Wegener Institute (AWI), Christian Haas and Hauke Flores for their input and participation at the Workshop. The LIA Logistics Workshop was funded through DFO Science funds for the Last Ice Area.

1.0 INTRODUCTION

The purpose of the Last Ice Area (LIA) Science Logistics Planning Meeting was to gather various project scientists and experts from government departments (Appendix 1) who have logistical responsibilities in the eastern arctic (specifically Alert and Resolute) to discuss details of the upcoming field season. The meeting followed on from a successful meeting on the LIA Science which incorporated a broader list of participants who have an interest in the LIA. The agenda (Appendix 2) was reviewed, and it was decided that due to early departure times for some participants, the main logistics would be covered that affected those who had to depart early, as a result the meeting was free flowing as issue topics arose. The meeting took place at the Bronson Room, Metcalfe Hotel, in Ottawa, on January 18 2018.

2.0 TIMELINE

Alert Spring 2018 (25th April to 6th June)

- Discussion on Boxtop Spring refuelling exercise ends 28th April, so it may impact start date. Might push start date back one week for first 4 people, but then 7 people would have to travel up; the request should go in right after this meeting to accommodate that. It was noted that Trenton can easily approve requests months early (this would be Feb 25-28 for DFO), however subject to cancellation on short notice and bump travellers.
- Discussed the possibility of Ben and possibly others coming up to Alert early to help with ice station location (unless high resolution images can be used). This could put a strain on accommodations. Fitting in last minute science people is a normal annual event, and not an issue for Alert
- AWI schedule to remain as shown in pdf.

3.0 ICE STATION LOGISTICS

- Skidoo commute, tents on ice for AUV and for CTD/niskins and core processing. JM DRDC will have 14-16 skidoos by then.
  CM introduced idea of tent on ice rather than at Alert for core processing. JM confirmed this is possible. Discussion on tent size: final decision Weatherhaven 12 x 28'. Planned set up: 2 weatherhaven tents 12 x 28' on the ice, one for ROV, one for CTD/niskins and water/ice sample processing.
- Discussion on flexibility for people to return at different times from station to Alert depending on their workload; i.e. if some participants finish late, it's OK for them to come back late to Alert. Not everyone needs to be travelling together at end of day. However, preferable to travel together in as much as possible (for safety) and for sure at beginning of day. Discussion on

snowmobiles and komatics. JM confirmed there are enough snowmobiles (12, 13) in Alert for the team, and enough komatics. No need to bring any from PCSP.

- Ice team: 12-13 people (DFO and AWI programs)
- Discussion on location of station: CH showed satellite ice image: Black Cliff Bay near William's Island (70m drop off to 130-140m). West of Alert point to avoid likely open water to east. May have to travel around from the south to avoid large ice ridge.
- Water depth: (CM) Target depth ca 100 m; < 200 m OK. Location of station best is first year and multiyear ice, but not too far out into mobile ice area. BL: multiyear ice adjacent to 1st year ice is ideal, that way can reach ROV from hole to first year ice area (300m distance)
    - How long is the trip? The long route to William's Island will be 15km out, take 1-2 hours to commute (max)
- Discussion on equipment / tent setup etc:
    - CB: DRDC tents available: weather havens: 12x28 = 2; 12x20=2; 12x12s too, will pick up toilet tents. ROV need a 12x28 tent (table and chairs). Better to have ROV in separate tent and hole, ROV needs to stay in water to avoid freezing. Separate hole for CTD / Niskin in "biological tent" (also 12 x 28') where sampling/processing will be done. Discussed activities at the biological tent include cutting cores, filtration; need for generator, tables and chairs.
    - Short discussion on CTD: HF has smaller CTD that fits in 15cm corer; CM: best to have winch, CTD and niskins all from one large hole for regular sampling (biological tent, separate hole from ROV). JM: no problem making any size hole. CM: 1 x 1 m sufficient for CTD/niskins- could also do regular profiles over 24h study if there's interest
    - HF: top 1 m water under the ice is most important, this resolution cannot be achieved by ship - noted potential effect of freezing in hole; HM: ROV cord on a drum (300m umbilical cord), need to lay 50m cord on the ice (space clutter issue in tent?).
    - Separate tents for cots in case do work around the clock
    - Tent on ice Generator: JM: 3.7 diesel, 2x2.2 diesel, 2.2 and 6.5 gasoline available. Generators should be big enough; generator for ROV and adaptor.
    - One generator for each tent, also have drip diesel heaters (Alaskan)
- Freezer space:
    - AP: need to know volume of cores for shipping south. Freezer may be full at that time of year, may need to ask kitchen staff for freezer space (-20c). There is a kitchen walk in freezer available with some space.
    - CM: we will have a small freezer to flash freeze -80 in the field, transport to Alert then put in freezer in Alert. Another option is to bring -80 freezer of our own? ECCC: Could get freezer from Trenton to Resolute in next few weeks (CM-we would buy from VWR and have it sent to Trenton).Need to look into this.
- Refrigerator space: Need fridge space for various samples. Full fridge and a bar fridge available in Alert.

ACTIONS:

- **Decision on plankton net mesh size for integration, size need not be too large**
- **Continued discussion with Alert to determine if sufficient freezer space for samples in Alert. Need decision on how realistic it is to procure a -80oC freezer and ship to Alert in time for the field program.**

4.0 SAFETY

- Travel to ice: Minimum of 2 machines at all trips (no solo trips). Can return early if done for the day, or late for long days
- JM: Safety: Users/researchers responsible for bringing their own helmets, visors; first aid kits DRDC provide safety kits, sleds, can't provide safety advice
- Repeater will be set up; radio used is VHF, with Iridium phones as back up
- DRDC Set up schedule call in (check in at arrival to site, and when leaving)
- CB: Also "in reach" is a really good system; shows up on map, Bluetooth connection ($300 per unit, $70/month plan) Iridium version called "GO" "hotspot" like twitter, 10.00 month when not used

4.1 Firearms

- Alert: shotguns; can't issue guns outside of DRDC; same with NRCan
- Shipping of guns and ammo an issue, perhaps use Basler or Twin Otter
- Bear spotter: local or from science team? If bring local need security check
- In the past have used Jopie/Tommy Kigeukput from Grise Fjord (bear monitor)
- Need total number, actual names can swap in and out
- If travel on DND flight, Thule needs month heads up, not a problem for Alert though; if direct flight to Alert, OK with DRDC

ACTION: Provide list of alternates and security clearance in case there is a change to names

5.0 SHIPPPING

- TP: PCSP so it looks like the amount of equipment going through Resolute is dropping, that will affect flights out of Resolute
- CM: most of the load ships from south; starting shipping end of January
- HK: Brought up the issue of equipment that needs NOT to be frozen. AP: Arrange NOT FREEZE equipment in one shipment
- Use triwall shipping box (4x4x4ft) 500lbs or less no problem, but in March capacity tightens up
- Trenton Capacity weight: 1000lbs staggered over few months; one every week or two

- Polar shelf flights – current plan (CM's application) is 2 flights up to Alert beginning of season.
- 2 twins and DC 3 were planned out of Resolute, BUT might not need DC 3 if more stuff is being sent out of Trenton
- DEADLINE for getting stuff to Trenton: beginning of March
- TP/TM: Tri-weekly charter for PCSP staff out of Iqaluit to Resolute- possibility to arrange to ship some equipment via that ATR 42 plane
- Generally 10-18 people so have room for cargo
- Could accommodate AWI as an option
- AWI needs to review, Basler has limited capacity; should have a single shipping list (HF and CH)
- CH: timeline is correct, AWI ship to Resolute 29th then on to Alert the Monday after (need to double check to confirm this later).
- Shipping to Trenton:
    - Downsview to Andrew he will readdress to Trenton "LABEL: LAST ICE PACKAGE #1;2…etc." keep in triwall boxes, or on pallet for larger equip. "lab equipment" works for most stuff except dangerous goods
    - Dangerous goods need to be id', MSD sheets sent with shipment, and backup copy to Andrew

ACTION: Need equipment weight estimates to PCSP ASAP after this meeting for Twin Otter planning

5.1 Hazardous materials

- Andrew needs sent ASAP to DRDC Trenton, and in separate packages from triwall, one dedicated person so can be slow processing hazardous goods
- Discussed Lithium batteries, batteries in equipment is ok, but extra spare batteries can be an issue some agencies are overly cautious. DFO has a shipper who packages batteries etc.
- Options: 1st Air Cargo: 2x/week – can be finicky too…but may be a better solution for lithium batteries, formaldehyde and ETOH
- Shipping Via DRDC works just need time and complete documentation
- CM: For DFO: Some equip through Trenton some through Resolute

6.0 OTHER ICE CAMP & EQUIPMENT ITEMS

- CM/JM: 2x4s for tripods? Jim-use pipe with an eye on it for better tripods (they have lots of it…will exchange email). They have most for field camp, no need for CM to ship/bring
- Rope: should bring your own
- Floors OSB for tents – in Alert, no need to ship

- Tables/chairs – in Alert, no need to ship
- Generator cables: bring your own: 14/3 cable, plugs and sockets
- Generator: oil and fuel (they have in Alert), 2 stroke oil: PCSP bring a box, and gas – 4 drums needed – confirmed in CM PCSP application; will be shipped by PCSP
- Propane: tanks requested 3 tanks – confirmed in CM PCSP application; will be shipped by PCSP
- Shovels/good quality ice picks -in Alert, no need to bring
- Long pipe over 10 ft shipping could be issue, DRDC can make something to grapple ROV

ACTION: Revised equipment list to PCSP from CM (next 2 weeks)

6.0 LOGISTICS RESOLUTE

- For people flying via Resolute: 2-Twin otters rather than 4 originally planned. Correct, re: CM revised request was sent to PCSP
- Few people coming thru Res beginning of May

ACTION: CH: Get kit list together with AWI and provide, double check list, may need more than two Twin Otters if AWI sending stuff, need to confirm

COFFEE BREAK

Logistics Resolute: cont'd

- SHIPPING: CH/CM: Need revised estimates
- TP: Any of the team staying in Resolute? Yes; Please provide this schedule information to PCSP; CM: was sent in final package to PCSP in Dec. Summary: Few people will be in Resolute from early May, will bring ice cores from Alert for experiments and analyses (2-3 weeks long), will need lab plugged in/freezer/counter space
- Discussed use of SeaCan; Conclusion: PCPS will power the SeaCan prior start of field season in May

ACTION: Resend most recent excel file to us at PCSP

7.0 LOGISTICS ALERT

7.1 Security/Medical (A. Platt)

- Govt Empl: reliability level security, PRI, gender, name, he can then book seats
  - Medical: go to GP get certified for isolated posting, sign form
  - Supposed to have HC semi-annual, but backed off due to privacy issues
  - DFO has annual medical (younger every 4 years, older every year)

- Non-Govt: CH crew: reliability clearance, they have security clearance; PDF's, co-op students for example, will need security clearance (can take long time)
- Non-Canadian: police record check
  - Need to start now for non-Canadians (black box time-wise)
  - Annual "reactivation" for continuing programs

ACTION: Need to begin process immediately for above security/medical as required

7.2 Lodging and other Alert logistics

- Alert: Clothing, towel, flip flops, AND sleeping bag if going through Resolute
- Freshwater: for ice tent: couple of Gerry cans of FW, but for super clean samples: de-ionized water – CM will ship for DFO use; lower grade rinsing water available on site
- Andrew: Meal schedule for those out of Alert, week days: breakfast 7-8, supper 5-6 (be there 5:30 latest). Can make hotboxes if /when working late. Any food allergies or special requirements should be indicated.
- Airfield open 8-4 Monday to Friday, can be issue weather dependent (exceptions can be made case by case basis, based on CO at time)
- Food and snacks can be taken out at camp; hotbox is easy for cook to prepare, box lunch provided for field work; "Hay boxes": hot water container: stew/lasagna to take out on ice for hot meals

7.3 Aircraft

- Twin otter guys: Shawn Newman filling in for Georges. Ken Borek –ok have their Red passes; PPR info provided; AWI Basler do same thing
- AWI a York University Project, and have a Nunavut Research permit
- License avoid low level flights…explain for surveys drones and mm surveys
- AWI has multiyear Nunavut Research license
- CM licencing: change in scope and location so reapplied
- Another TFAX in summer- German project, therefore need MSR
- CH: TFAX is a sea ice survey – summer- will extend to Alert
- Drone special permission from ops to fly drone near Alert, frequency, power etc ; TC permit as well need specs on OPS;

ACTION: Recommend getting ops permission before go to TC to smooth application process. Ben will send drone specs to Andrew; also PPR

- CH: TFAX early August flight survey (low level); but not suitable for mm, could add cameras resurvey May transects, using buoys to mark, have laser scanner and ice thickness; SF: only sept mm survey currently; CH: could move flights to overlap transects for MM surveys? SF: could think about coordinating mm survey with TFAX

7.4 Costs for Alert

- OGD: $107.45/day; in the past have included AWI
- IF not: would be $300/day
- Work clothes: bring your own
- Other costs: $756.00 each way /person from Trenton to Thule to Alert (or 1532 round trip)
- $ 3.35/lb for cargo (OGD rate)
- DRDC has an agreement in place with DFO for 2018/19, would need to amend to accommodate increase in personnel costs for accommodations.

8.0 MARINE MAMMALS SURVEYS

- Will want open water to look for whales; it will be a random design; need to plan for analyses, (from Nares Strait north)
- Courtney Watt could possibly do 21st August onward to make it work for Steve's MM work
- Weather poor in fall, fog dominates
- CM: Andrew do you need survey dates for fall? Andrew: just need a range of dates; aircraft using runway, submit PPR request closer to the time

8.1 Spring Marine Mammal Surveys

- SF: 28 May to 4 June spring mm survey (few days allowed for bad weather)
- Showing 25 hours (35 hours MM survey=25 hrs actual survey); 6 days max if weather allows
- End of August if can coordinate off Courtney Watt's work (Pond 19th, so could be ready 21st
- NOTE: Easter and Victoria day holiday, airport closed
- Fall survey 25 hours Keep as is need to discuss further; mostly exploratory survey
- TFAX 25 July 19 Aug, no overlap with MM.
  Fall work straight to Alert via DND, deploy moorings
- AP: Sandy Stephen from EC interested in snow samples for Hg from ice site(s).

9.0 FUEL

- Fuel supply: DRDC wants to know how much fuel intend to use and how replace
- AWI: 27,000 litres on credit in Alert, how much need and share?
- AP: For AWI for May and TFAX need 20,000L (includes SF fuel), net transfer 12,000, leaves about 11,000L for DFO– CH: DFO can use if replace by March 2019. The math doesn't seem to add up; less fuel left than planned, maybe only 7000L for DFO?
- CM- fuel estimate: Need for 30 hours survey + Twin flights to/out of Alert- Eureka.

- Flights to Eureka and back= 4 trips Alert to Eureka. Fuel available in Alert insufficient for needs. Original plan was to use CH's fuel this year and replace next fiscal; this is a change of plans.
- Funding for fuel: Net 10,000L per delivery; Both flights $200,000
- If this year can buy fuel for surveys how can we get it? DRDC has Standing Offer up to $100,000 or have to go thru bids (only 2 companies)
- TM/TP: $120k per trip for 10,000L PCSP may be able to use NMSO at $400,000 to mobilize fuel for DFO
- CM: Will look into a means to purchase fuel this fiscal
- PCSP: If can do two trips do it now; Could do same again next year, used to using PCSP
- $220k included fuel (for $20,000 L)

<u>ACTION</u>: URGENT: CM/PCSP: Will look into ways to purchase and send fuel to Alert immediately

LUNCH

10. BUOY DEPLOYMENT

- POPS profiling system: Mobilize initial week with arrival of Twin Otters; as far to the NW as possible based on safety/fuel; Going to land on sea ice – Ken Borek – Coms want two planes on ground in Alert
- Don't know pilots, but request to Ken Borek experienced pilots
- Mooring: go up through Resolute; too late for Trenton DND; either Cargo to Resolute, or may have to bring up as personal baggage
- AP: Sandy Stephan ECCC: may be up there at that time, request snow sample for Hg measurements wherever you land
- 3 people staying one week after everyone else + aircraft leaves–marine mammal surveys
- Discussed students and need for security: CH's PhD student, AWI, Karley Campbell at Bristol in UK (do they need finger prints for security)- CM: she has security from DFO, should qualify; Alex out of York may need to start process from scratch
- There is space to store stuff in the spinnaker warehouse, and limited space inside where it is warmer and cleaner, but more space in the larger warehouse where stuff can freeze to-40°C

<u>ACTION</u>: responsible collaborative agencies should ensure security requirements are met for the students/participants.

11. ALERT FOLLOW-ON FIELD LOGISTICS QUESTIONS

- CM: If on ice and have a hole, can we do 24 hour sampling? JM: Yes, just have to let them know, cots etc. will be out there for use
- CM: Sample processing: lab tent on ice; still need indoor lab space at Alert lab is there plumbing? JM: Yes, to rinse stuff – CM: need tables – e.g., microscope work
- CM: Resolute: lab crew; working on samples out of Alert; experiments that last long time (10d); start of season – at beginning of season- get cores down to Resolute
- BL can go up early to start cores with DRDC to get these samples for shipping to Resolute for analysis
- Agreements: A discussion took place about various cost recovery agreements and collaborative agreements, and it was concluded that a number of bilateral collaborative agreements are needed between all partners of the project; (DFO and each of: DRDC, ECCC, PCSP, AWI).

ACTION: Initiate collaborative agreements as soon as possible.

12. 2019 AND BEYOND

- An open discussion about the project beyond this year; how to entice other researchers interested in the LIA project, challenges to expand beyond current project, budget relatively small vs logistics requirements;
- CM: somewhat already committed to next year, but definitely open to further discussions;
- HM: need discussion about how to leverage other DFO funds in light of current lack of funding for work that could link to LIA; e.g., Mike Steele: re-apply to "switchyard program"? ONR funded in Beaufort
- Need to decide if expanding geographic scope without bringing in more resources (e.g., Eureka, ship-based)
- CM: reminder that the main focus of the current funding is to "characterize the ecosystem for the last ice area"
- There is potential to look at LIA from various DFO regions e.g., from West with Louis St. Laurent, and Alert from the east
- HM: Physical oceanography – have to find $ elsewhere, leverage this program. Ocean currents and ice: long-term data sets, need to continue this since oil and gas has lost interest – need $ to continue (100K for one staff, 100K for mooring deployment)
- General discussion about logistics for 2019: if going back to Alert, consider shipping stuff up by sealift – to Montreal by May, would get stuff there in October
- Military depot in Montreal and they ship to Thule and then fly to Alert late September – dry boxtop

- End of April to Downsview for crating – to Montreal – to Alert October 2018.
- June-August impossible to ship stuff up (construction season)
- Possible for lab container/moorings to be shipped up; AWI – lab container – need to talk about that: it is a one way trip (no way to ship it back)
- AP: CWS bird people had an SST trailer (ATCO trailer currently 6km south of Alert) asking about it; multipurpose lab near the station
- SF: Marine mammals would like 2 years minimum; CM: Possible ideas next year – add fish component, tag MM
- CB: Anecdotal observations are made from Alert staff: e.g. spring bunting, seals in bay, polar bears

Meeting adjourned 15:20h

Appendix 1. List of Participants

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Appendix 2. Last Ice Area Science Logistics Planning Meeting Agenda

9:00 Agenda for Logistics Meeting (Chair)

9:15 Science Plans 2018-2019

10:00 Detailed work plans for spring 2018

10:30 BREAK

10:45 Detailed work plans for spring 2018 -continued

11:15 Moorings, real-time data, ROVs, drones

12:00 LUNCH

13:00 Field Program Logistics & Coordination (e.g., timeframes, shipping, equipment consolidation, licensing etc.)

14:00 What's next: Preliminary Plans for fall 2018, 2019 and Beyond

14:30 Meeting Adjourned